NASA Announcement of Opportunity, NNH07ZDA003O
"Explorer Program: Small Explorers (SMEX) and Missions of Opportunity."

Technical Interchange Meeting/Briefing in Support of Small Explorer Missions of Opportunity AO
Held on Wednesday, December 19, 2007.

Transcribed Questions From / Answers To Potential Proposing Community

Question Number	Date Received	Date Posted	Question	Answer
TIM1-1	Wed, 19 Dec 2007		[Asked on slide 8] Do we have any international partners on this telecon?	No. This is an ITAR-restricted meeting. We only have U.S. citizens and green-card holders who should be listening in or here at present. [AH]
TIM1-2	Wed, 19 Dec 2007		[Asked on slide 8] How do we involve our international partners?	There are two ways to involve international partners. The first is they have access to information on the International Space Station through their agencies if their agency is a participant in International Space Station. (European Space Agency, the Japanese Aerospace Exploration Agency, the Italian Space Agency, and the Canadian Space Agency.) The charts that you see today are ITAR restricted; however, we are providing a version of the charts that have been approved for public release. These charts and the Question matrix will be posted to the website. The link was provided to you in the Announcement materials along with information that you might need on Space Station in order to respond to this proposal. And there are a number of agencies that have investigations already planned for ISS that are in these disciplinary areas, and so if you know them through your collegial relationships as well, that's another way of forging that international collaboration. [JR] All of the data that are collected as part of this AO

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				must be made fully public, in a usable form, in a reasonable time. [VJ]
TIM1-3	Wed, 19 Dec 2007		[Asked at end of VJ presentation] At the beginning, you said that planetary science was excluded; is that true for the ISS amendment as well?	Yes. It is an explorer AO that addresses heliophysics and astrophysics objectives. [VJ]
			Understood, however, it seemed like the exposed facility was an ideal platform to do astrobiology and planetary protection work.	There are other opportunities for the planetary missions to propose. In particular, there is a plan to release annual Missions of Opportunities, a solicitation called SALMON, Stand-Alone Missions of Opportunities. [VJ]
			Understood, however, this was so specific for the exposed facilities, saying it was going to be very general.	The SMEX AO is very general for both heliophysics and astrophysics.
TIM1-4	Wed, 19 Dec 2007		[Asked at end of VJ presentation] Is there going to be any planned opportunities for Earth Science-based proposals on the ISS?	Unknown. The Explorer-based AO does not provide opportunities for Earth Science on the ISS. The Earth Sciences has had its own parallel with Explorer called Earth System Science Partnership (ESSP), and they in fact have had payloads on the Space Station previously. There are four divisions in the Science Mission Directorate: Earth Science, Planetary Science, Heliophysics, and Astrophysics. Planetary and Earth Science have their own solicitations; Heliophysics and Astrophysics together have the Explorer Program. It is believed Earth Science will participate in SALMON to enable an opportunity. [VJ]
TIM1-5	Wed, 19 Dec 2007		[Asked at end of VJ presentation] For Missions of Opportunity proposals that propose to contribute to an international	Please discuss with SMD.

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			mission, is the deadline February 12 or a different time?	
TIM1-6	Wed, 19 Dec 2007		[Asked at end of VJ presentation] Can those who fail to submit to the NOI still submit a proposal?	Yes. NOIs are not required. They are helpful to us in setting up the review panels. [VJ]
TIM1-7	Wed, 19 Dec 2007		[Asked at end of VJ presentation] You are taking notes from the SMEX AO briefing and will respond to them for all to see?	Yes. [VJ]
TIM1-8	Wed, 19 Dec 2007		[Asked at end of VJ presentation] Is there a telephone number for NASA's ISS Payloads Office?	Yes. The telephone number for the ISS Payloads Helpline is 281-244-6187. [RW] Per the request of the Science Mission Directorate, we have firewalled the Payloads Office during the development of proposals here, so that every Principal Investigator gets equal access to the information that the Payloads Office has to provide. Although perhaps challenging for potential proposers, this action was taken to ensure that there is a level playing field, and that perhaps those of you who may have collaborated with one or more individual who is a member of the Payloads Office now do not have an unfair advantage in the competition. So, we are not responding directly to communications that reach us; we're funneling all those questions through that phone number, and through that email address that has been in the solicitation during this competition-sensitive period. pdl.helpdesk@msfc.nasa.gov [JR]
TIM1-9	Wed, 19 Dec 2007		[Asked on slide 17] On slide 17, which is the pitch axis?	The best way to answer that is: if you were standing on a very tall mountain looking at this picture, the

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				Space Station would be coming right at you, and it would be pitched down 12 degrees. X-axis is coming at you. [GC]
TIM1-10	Wed, 19 Dec 2007		[Asked on slide 32] Can you have antennas or something that might be retractable that could go beyond this envelope?	Yes. That would be an exception, kind of a waiver process that we would have to go through to certify that that is a doable thing.
TIM1-11	Wed, 19 Dec 2007		[Asked on slide 32] Will you be considering on the P3 Truss any switch or movement of the nadir ELC to zenith? When will that be decided?	That is being looked at right now. The plan right now is to leave – if you go back to slide 30, there is a platform there called ESP3. One of the plans being looked at is to move ESP3 to another location and put the nadir ELC at the top; this is still under review. The Payloads Office has told the OM Office, which does the planning for this, that we want to have an equal number of zenith sites and nadir sites, and they're trying to accommodate that requirement. The assembly sequence has always been kind of a moving target, so they're working out now the best way to do that. I think the decision of whether to move that ELC or not will be made within the next couple of months. But then there is potential that it may be changed several times. If you have a requirement to be a zenith-facing payload, we will accommodate that requirement. [GC] And we are in the process of conducting the manifest planning for Increment 19, which includes the first flight that will have the ELCs on them, and so that process will also start encouraging everyone to start making the decisions needed to get everything in place. [AH] One other point, the S3 sites and the P3 sites all have the same services on ELCs. [GC]

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TIM1-12	Wed, 19 Dec 2007		[Asked on slide 40] Could you discuss the columns labeled "Allowable Payload Weight" and "Accommodation Weight"?	The JEM-EF and ELC weights are tabulated differently. For the JEM-EF weight, we include the weight of the adapter. The purpose of this chart was to try to break all that out so that you would know exactly what you had. The Allowable Payload Weight column is just pure payload without an adapter. The Accommodation Weight is the weight of the adapter and all support equipment that you would need for your payload. The Allowable Payload Weight is actually what you could have for actual science experiments. The Total Weight is just the sum of those two. [GC]
TIM1-13	Wed, 19 Dec 2007		[Asked on slide 40] For the Payload Volume for JEM-EF, some payloads attached in different directions, and all of them appear to be tilted more along the pitch axis. Do all the experiments have to be confined to this volume? That's exactly my question. Some payloads are in parallel, next to each other. But there is one which is pointing in the orthogonal direction and one is far away from others.	Yes. That is a robotics constraint. What drives the volume is the fact that two payloads have to be a certain distance apart because of inaccuracies in the robot positionings. The two sites on the end, there is actually more space there, however those two end sites for docking of the HTV Exposed Pallet and there may be an application for the other. There are places on the JEM-EF where you could exceed this volume; we advertised this volume so we could have the flexibility when manifesting a payload. If you need a larger size that what is advertised, that would be an exception that we would work. [GC]
TIM1-14	Wed, 19 Dec 2007		[Asked on slide 40] Will an application containing the different views from the payload sites be made available for planning purposes?	This information is provided to us by our Magic Team. We submit a request for viewing analysis, they do not provide an application that can loaded

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			How would you cost or propose getting that service?	onto computers outside the Team. We do have some studies that can be made available that show more detailed views. Should you be selected, then that service would be part of the standard services provided by the Payloads Office in order to help in analyzing and developing your payload. If there are specific questions that need answered in order to complete the proposal, the first thing we can do is provide the document that was part of a larger suite of comprehensive studies. We are unable to post this publicly due to export control restrictions. Should the study not meet your needs, then we can work to address your specific questions.
TIM1-15	Wed, 19 Dec 2007		[Asked on slide 41] I see the data rates, but is there any data buffering capability? From what I understand, the ISS will act as a bent pipe when you're in view of TDRSS (Tracking and Data Relay Satellite System). But when you're not in view of TDRSS, is there any buffering capability for the data?	There is an on-board recorder that will extend the coverage time beyond when TDRSS is available. That data could be downlinked, however, if there is a competition for who has a data link, the ELC itself does not provide buffering. We have a limit on the number of these sites that can actually be active at one time. [GC]
TIM1-16	Wed, 19 Dec 2007		[Asked on slide 41] In the Power and Data Availability chart, it does not include HTV. Understanding that the HTV document is in the draft stage, is it known when the information on exact power and voltage capabilities that the HTV is in pre-flight will be available?	We have a follow-on presentation from Chimin Chang that will go in-depth on the HTV, and I believe that information is in his presentation. [GC]
TIM1-17	Wed, 19 Dec 2007		[Asked on slide 41] On the downlink capabilities for these facilities, are those data carried on the Ku-	It can go either way. This is all at the location, and it is connected to the ISS data system and it's either

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			band or on the S-band?	Ku-band or the S-band. [GC]
TIM1-18	Wed, 19 Dec 2007		[Asked on slide 41] Can you define, in bytes-per-second, the high-data-rate capability?	The specification for the ELC is that it should be able to transmit 6 megabits per second for each payload. The JEM-EF and Columbus are 10-Base-T technology. I believe that 10-Base-T technology is limited to 10 megabits per second. 1553 only supports for 1 megabit at that format; some of that megabit is overhead, I've believe that around 700 kilobits of data are available. But that is not for each site; that is a combination of everyone. The optical fiber I believe is rated at 100 meg, but the Station total downlink I believe is 90. So if you have that capability, you shouldn't be data limited by the carrier itself; you're going to be limited by other users. [GC]
TIM1-19	Wed, 19 Dec 2007		[Asked on slide 41/46:41] Are these powers for everybody?	The power is a complicated situation because its dependent on what the wiring can support. Due to the current power situation, we might be power limited. It is unknown how much of this power could be made available at any given time. Don't expect, for example in the ELC case, to have access to the entire 750 watts and 500 watts all the time. The power usages will have to be timelined. It might be a good idea when you develop your experiment to determine what the keep-alive power requirements would be. [GC]
TIM1-20	Wed, 19 Dec 2007		[Asked on slide 41] Can you say something more about the cooling on the JEM?	Yes. The PIUs have two quick disconnects that if you had a payload that needed cooling. The system has an interface to the same cooling loop that's used inside the JEM for pressurized payloads. [GC]
TIM1-21	Wed, 19		[Asked on slide 41]	

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	Dec 2007		Should we be assuming thermally isolated experiments [inaudible] on the JEM?	The way we have written our interface requirements, we expect you to be able to radiate to deep space and not toward your neighbor. And we don't permit using the Station as a heat sink. You should be designing your experiment thermally to where all the heat is radiated to deep space and you do not conduct it to the carrier or to the Space Station or to your neighbor. [GC]
TIM1-22	Wed, 19 Dec 2007		[Asked on slide 41] Did you say that for the Ethernet medium data rate line, it's 6 megabits per second per payload or is that is shared for an entire ELC pallet? The document we were looking at said 6 megabits per second shared among payloads on a pallet. Can we reference this conversation instead of the documentation that's out there in print?	Yes. The spec is 6 meg(abits) per payload. So that would be 12 meg(abits) for the pallet. The Goddard implementation is for two 6-meg(abit) inputs. The three documents that are listed later in this presentation carry that information. One of the ELC documents is in draft form right now. If it is documented incorrectly, we'll go fix it. But in answer to your question, it's supposed to be 6 megabits per payload. But again, understand, you will not have the 6-megabits 24/7. [GC]
TIM1-23	Wed, 19 Dec 2007		[Asked on slide 46] The documentation is where?	The documentation here resides on a document system that is called the EDMS system (Electronic Data Management System), and if your payload is selected, you would have access to that. I believe there is a process in place to distribute that to the payload composers. [GC]

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			That would be probably be good for the proposers to know that also.	We are having those documents being made available. You should have access to all four of these documents. [GC/RW]
TIM1-24	Wed, 19 Dec 2007		[Asked on slide 46] What about small payloads; can they be installed inside the ISS for the duration of the experiment?	Yes. Mr. Joseph Pelfrey's discussion is going to address the facility we have for pressurized payloads. [GC]
TIM1-25	Wed, 19 Dec 2007		[Asked on slide 46/55:21] What about for non-observational experiments? I believe that it will still fit into the call.	For non-observational, yes, there are facilities, but it might not be part of this AO. We would need to see the proposal for what is the answer. [GC] We have capabilities, it would just depend on whether that's part of this AO [AH] We have rack facilities that can accommodate payloads, if that's the question, but we just have to look at it. [GC]
TIM1-26	Wed, 19 Dec 2007		[Asked on slide 46] For the purposes of proposal submission and mission selection, is it advantageous if your experiment could support installation at multiple external sites? Should that be proposed, or should we pick one and focus on that for the proposal?	From a manifesting standpoint, if the payload could be mounted at multiple sites, it allows for more manifesting flexibility. But whether that's actually a constraint as to whether you're selected or not, I wouldn't be able to address that. [GC] As long as there are some differences in capabilities, differences in the way they are attached, and the viewing ends up being a little different as well. Pick a primary location and then indicate that you could also go on another one, just as an approach. But it would probably be best to pick one site as your primary. [AH]
TIM1-27	Wed, 19		[Asked on slide 46]	

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	Dec 2007		With the demise of the Shuttle program, what are the possibilities of returning the payload?	It is my understanding that for post-shuttle we have a total of 90 kilograms of downmass available for everyone. But for facilities we've addressed do not have a robotics capability to remove samples. Nothing can return a CEPA- or FRAM-sized payload. So it's pretty much designed for a one-way trip. [GC] We have a couple payloads that are planning to bring small packages back that might fit in the Soyuz vehicle, which is the only vehicle right now that we can be assured will have some downmass capability. Maybe eventually we will have a commercial capability that will provide some downmass. But we can't take the total experiment down, and that should not be anything that you would consider. But if you have some smaller packages you would like to get back down, then that could be looked at; also taking smaller packages back up to replace those is a possibility. [AH]
			Can you define small?	That's a good question, and that depends on what of those 90 kilograms is going to be allocated to payloads and the priorities of the payloads that want that space. For example, I wouldn't be proposing for more than 10 kilogram return capability at this point. [AH]
			How many meters?	We don't have the volume numbers to give you, but I think at this point, you would just indicate as best you can what you'd like to do, and it would have to be iterated if you were selected. [AH]
TIM1-28	Wed, 19 Dec 2007		[Asked on slide 46] Can we get a general sense of which of these locations has the least obstructed zenith view?	The data that we would be using are the same that are in the pitch. [GC] In one case of a payload that we're looking for the ELCs, the study concluded that in the case the zenith

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				view, it is best to be on an ELC. There has been some competition for all three sites, especially those that have good viewing, so the ELCs have potentially more opportunities right now. [AH] One thing not shown in today's presentation but is in more detailed studies, is that the solar arrays might be rotating through your field of view. If a solar array passing in front of your field of view periodically interferes with your science, then the view is off and obviously much more restricted. [GC]
			We'll know when that happens?	Yes. [GC]
TIM1-29	Wed, 19 Dec 2007		[Asked on slide 46] If there were heliophysics science experiment and you need to look at the sun, would it be possible to be mounted outboard of the solar rotary joints?	In the past, payloads have been mounted in non-standard locations. Handrails are an example. Due to the amount of analysis and difficulties that are involved, we are discouraging mounting to non-standard locations. [GC]
			What about Power and data?	About the only place we can[get power for you is from the camera ports that are scattered all across the Station, but it is a non-standard integration effort and the cost associated with that is significant. So while technically I guess you could, we would prefer you stay with one of these locations. [GC]
TIM2-1	Wed, 19 Dec 2007		[Asked on slide 67] If there is a FRAM payload going on an ELC site, later in this package, you have show that the volume is restricted to the volume that Gene showed earlier. This slide (HTV EP Configuration) suggests that it's different. Can you clarify this?	Yes, this is volume specific to HTV-2. In later charts, it shows the current manifest baseline, JAXA has to allot pallet configuration multiple years ahead of the schedule. The manufacturer's certification of the pallets takes 2 years therefore the decisions have to be made ahead of time. Currently the HTV-2 is capable of carrying either 3 JEM-EF payloads or 2 JEM-EF payloads with 1 FRAM, and the FRAM

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				height will be limited. But I'm not saying we can't work with JAXA through the exception process to get it a little bit higher because those are really the robotic constraints.[CC]
TIM2-2	Wed, 19 Dec 2007		[Asked on slide 64] Will this configuration be able to accommodate 2 FRAMs payloads?	Yes, if you go to page 68 (HTV EP Configuration, Type IIIc), it show another type of carrier, which has nothing to do with us; this carrier is baselined to be attached to the MBS POA on the other side of Station not to JEM-EF. The significant difference here is at the bottom right corner, they have replaced the payload interface unit with grapple fixtures on the pallet. So it refers to the ISS POA which is sitting on the mobile transporters which can be carried as a pallet and transferred along the truss and can reach to ELC. [CC]
TIM2-3	Wed, 19 Dec 2007		[Asked on slide 68] Is the Type IIIC the same as your EP-MP? OK so should we be referencing EP-MP as the reference requirement? And that would be for those types of payloads that would be transferred through the ELC, is that correct?	Similar. In on-orbit accommodation by the pallet capability, especially the structure, it is different [CC] Yes. [CC] Yes. With the exception if your payload comes aboard earlier than 2010 on HTV-2, that would be limited. [CC]
TIM2-4	Wed, 19 Dec 2007		[Asked on slide 70] If we are to construct to the ELC volume, will that fall within the closed volume for the HTV EP-MP?	Yes. Later in the presentation, the ICD slides have the cross-section that shows the envelope and location constraints. [CC]
TIM2-5	Wed, 19		[Asked on slide 76]	

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	Dec 2007		Does the payload volume include the interface plate between the FRAM and the payload? For example, the interface plate between the payload and the ExPA, that should not be included within payload volume?	No. If you look on page 76 (Payload Allowable Up-Mass and Volume Summary Table), the bottom three rows contain net payload volume. [CC] Yes. Where you can see the HTV application, the final net cargo envelope shall meet the ICD's. So when we go to the EP-MP ICD, you ought to be able to see it. We should be able to accommodate most of the volume with some minor constraints and a couple inches of shorter than this volume in some locations. [CC]
TIM2-6	Wed, 19 Dec 2007		[Asked on slide 76] Is PIU included or covered in the payload weight?	The PIU is part of the accommodation weight column. If you see a label "JEM-EF payload," that 121 lbs includes the PIU and grapple fixtures. [CC]
TIM2-7	Wed, 19 Dec 2007		[Asked on slide 81] When the payload gets delivered to the launch site or to the Cape are we responsible for the functional testing when it's delivered then hand it off to the launch service team?	In general, it's true unless you have unique requirements even after integrating onto the carrier and you still need to do some functional verification. It depends on instrument sensitivity and requirements. Normally, once installed on the carriers, there's no support required from the payload developer, but just to stand by to support the final integration by JAXA for insertion of the intefrated carrier into the ELC. And this will be done at launch site at Tanegashima. [CC]
TIM2-8	Wed, 19 Dec 2007		[Asked on slide 81] What kind of environment is the payload in? Is it dry air, is it nitrogen?	There are various stages of operation. The initial stage when you deliver your payload before you hand off to JAXA, I think the specs of a class 100,000 clean room are preferred. Of course you can get nitrogen to continue to purge if you have such a requirement. But I think with some US

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				payloads need to continue to purge dry nitrogen into their sensor to prevent condensation, even in the COTS are 100,000 clean room. But after handoff to carrier pallet integration, it's not in the class 100,000 clean room anymore. But maybe in a nitrogen purge environment or a ventilator environment for that carrier integration, there are guideline requirements documents available for you to look at for the Tanegashima facilities, capabilities, and specification throughout the entire process. [CC]
TIM2-9	Wed, 19 Dec 2007		[Asked on slide 81] For the shroud for the launch vehicle, is it filled with helium? So it's nitrogen or something like that?	No. [CC] Yes. I think it's going to be ventilating dry air with a humidity specification, which is available to you. [CC]
TIM2-10	Wed, 19 Dec 2007		[Asked on slide 82] Is it the payload developer's responsibility for everything above the mechanical interface plane? Of the GFE, will the active FRAM, passive FRAM, and passive FRAM plate be provided to the payload developer?	Yes. [CC] Everything from the payload down should be GFE. [GC] For electrical, the blue harness probably also would be provided. [CC/GC]
TIM2-11	Wed, 19 Dec 2007		[Asked on slide 82] I understand that everything between the mechanical interface plane and the payload is GFE, however, in terms of construction and integration to the FRAM portion, is that to be done by the payload developer, or will	Once we deliver all the GFE to you, the integration analytical and physical will be done by you, including FRAM. [CC]

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			that be done elsewhere? It is still TBD as to where this assembly takes place?	Yes, right, it is TBD. But to be safe, I would encourage you to consider this task to be the payload developer's task, but they may be lenient because there is a person to help you. Or we come up with some kind of initiative of finding someone to help you to integrate because we have all on you—remember [inaudible] it's JEM [inaudible] that's all on you, and it's going to be using the same concept to be integrated somewhere. [CC]
TIM2-12	Wed, 19 Dec 2007		[Asked on slide 84] If we have an ELC experiment launching on the Japanese HTV, and we want to do a post-delivery functional test, from what I see, the exposed pallet on the HTV only provides 120 volts if we pay extra, and 50 volts. When we are connected to the ELC, its 28 volts and 120 volts; so we have to design our avionics to work on 28 volts, or something like that. Is there going to be any way for us to get 28 volts once we're on the exposed pallet to test our hardware for post-delivery functional test?	At this moment, no. [CC] We're having similar discussions about ELC testing, and we have some power supplies in the agency that can be provided to you to for ground-testing power. But if your question is, is that power source provided during the ascent phasing, the answer is, no it is not provided. If you need to test it on the ground before you ever transfer it to ELC, we can provide a power source that can emulate that point. [GC] But if they want to test in the integrated configuration, that will be difficult because the FRAM connectors are unique. For NASA first payload, I encourage them to design a test port on the side closing of not to end to end, truly end to end, for the FRAM connectors, but should be good enough for the test port on the side, you can plug in from the data, instrument health check, power, everything you need you need access. You provide a back house to a test port for access than using your own power supply and data management system to do anything you need to do. That's why I encourage them to incorporate its design in the data. [CC]

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TIM2-13	Wed, 19 Dec 2007		[Asked on slide 84] You've got the pointer, the 2857 document, and from the looks of it, it looks like it is very much in draft form. It's difficult to find certain information. For instance, thermal information, the thermal environment prior to ISS docking. Where would you recommend we find this type of information? I understand but if the guiding document is 2857 and this document is not complete, what would be the overriding or the suggested document that we would use? So if it does not contain certain information, are you saying that information may exist in one of these other documents?	Yes it is. [CC] Through the same contact information that you have, you can request any of these document or any other documents. We just have to ITAR screen them, and than can distribute those documents to you on request. We just can't post them to a website because of the ITAR control. [JR] I don't suggest override this document. Even its draft form, but it's in best shape because the first NASA payload used it to flow down to ICD. And JAXA doesn't see any significant change. The only reason it is in draft form is it is in signature loop. [CC] Any information you need in addition to this document, send a request to the Help Desk. We will address it and provide you it. [CC]
TIM2-14	Wed, 19 Dec 2007		[Asked on slide 86] Do you have a schedule that shows how we would have to incorporate the safety reviews as part of the design process?	On page 86, it shows you a flow chart of the safety review process for the flight safety. Phase 0/1 normally is in conjunction with between your PDR/CDR, this should occur as early as possible, it can be in the early stages when there is not much detail. At this time you can incorporate a lot of generic statements. It has to happen before your CDR.

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				Phase 2 occurs around 4 or 5 months your CDR. Phase 3 is a few months before flight; normally it's like a month before flight. In this case, this conceptual flow chart demonstrates the information from JAXA showing Phases on early agreement for getting NASA payload or NASA sponsor/supported payload. Phase 0/1 will be conducted at JSC; Phase 3 will be conducted at Tsukuba. During Phase 0/1, JAXA will send two representatives here to attend the safety panel review, and all the data packages are required to be delivered to the board prior to your schedule. The board will seek export control approval for you and then will deliver to JAXA for their review. The JAXA review will include engineering and safety, both disciplines. For Phase 3, the whole package, it's not quite clear how NASA wants to handle this (it may not in the agreement), but JAXA has proposed everything go through their process delivery to JAXA in English, and then the safety review will be conducted in Tsukuba. [CC]]
TIM2-15	Wed, 19 Dec 2007		[Asked on slide 86] It says in the NSPIRES that we're supposed to deliver our payload 9 months prior to launch, but now you're telling me that the safety review says 8 months prior, so you'd have a Phase 3 safety review after your payloads are readied to be required to be delivered?	That's correct, it was there. [AH] If it's in the request, and you can do better, I think it's always encouraged. But based on the current compressed integration schedule, JAXA can tolerate L-minus-5 or minus-6 delivery at Tanegashima. So, of course, with the request, we ask you to do your best, but everything is running on a compressed schedule, even the launching process. This launch process for HTV, JAXA has streamlined it for us.

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				Otherwise, it will synch up with the AO very well for you to deliver at L-minus-9. But since everything is compressed, I think they have relaxed that a little bit. [CC]
TIM2-15	Wed, 19 Dec 2007		[Asked on slide 86] Are you saying there are two separate safety review sets, one for the Payload Safety Review Panel for NASA, and one with JAXA? They're not going to be one in the same?	What I said is JAXA has proposed Phase 0/1/2 to be held at Johnson Space Center and chaired by NASA's safety panel. JAXA will send a representative here. So it's one process. Phase 3, which is about a month before flight, will be conducted at Tsukuba, chaired by JAXA's safety review panel with NASA's safety review panel attending. It's one process and one packaging format for NASA's standard. [CC]
TIM2-16	Wed, 19 Dec 2007		[Asked on slide 86] If a payload goes to ELC, then what does the review process look like?	Actually, in this process here, for example this payload goes to a JEM-EF, and JAXA will ask you to deliver a package, including all aspects of requirements compliance demonstration, which will flow down from various sources, including the JEM-EF IRD. But NASA's focus for Phase 0/1/2 may be just a vehicle compliance, but when you go to Phase 3, it's going to be a combined review. And if your hardware is manifested on ELC, it's your final destination; I think that the focus for Phase 3 from the HTV perspective will be a little bit different. But you're still generally one package to show overall compliance. What happened yesterday, we experienced the—the chairman just skipped all of those non-related required compliance, and reserve those for a future meeting. [CC]

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TIM2-16	Wed, 19 Dec 2007		[Asked on slide 88] Will an assignment of an additional, say, equivalent PIM be assigned from JAXA to the payload developer or will there be a single PIM point of contact that will cover both? Where will that PIM be located?	Your NASA PIM will be your primary interface as a payload, and then whomever on the JAXA side will be assigned, that's whom our PIM will coordinate with. [JC] At JSC. [JC]
TIM2-17	Wed, 19 Dec 2007		[Asked on slide 90] The proposal says that we have to deliver at L-minus-9 months, so at L-minus-9 months, do we deliver to KSC? So will that be changed in here or do we have to deliver at L-minus-9 or L-minus-4?	No. I think you will keep at your facility. There might be a couple of months they will be staging at their own facility.[CC] Yes, we need to make a change to that that part of the AO.[AH] We'll submit the question and we'll get the answer back to you. [AH]
TIM2-18	Wed, 19 Dec 2007		[Asked on slide 90] Will we responsible for the cost of delivering our payload to JAXA? Will a shipping container be provided? And then where do we ship it to? KSC or Tanegashima? The proposal states delivery at L-minus-9 months. And do we pay those costs?	The first experience we worked with the first payload is the payload developer will spec cargo containers which meet their own needs, and they develop earlier and pay by themselves, no wonder they find it useful. And then, finally, UPS, which is pretty cheap, and ship to Tanegashima. [CC] No. [GC] Tanegashima is where you need to deliver, that's clear. We'll get an update on the date. The only requirement is to get the payload to Tanegashima, so anything else you do is on your ticket and will be special activities that you would do. [AH]

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TIM2-18	Wed, 19 Dec 2007		[Asked on slide 90] Is KSC not in the loop?	Not at this moment. [CC] They are not a delivery point; they are a helper. To clarify this, you will have to Tanegashima who are looking at using KSC resources to help with the pre-launch process. But for scoping the size of your proposal, you should put in funding for being able to deliver your payload to Tanegashima. [GC]
TIM2-18	Wed, 19 Dec 2007		[Asked on slide 90] What would you call in the definition data the payload relationship to the safety reviews? Is the definition L-minus-24? Where would be in the safety review process? Would that be then 0/1/2? When is Phase 0/1? L-minus-date?	Phase 0/1 happens before CDR, after PDR. At this stage in the payload development, it is not mature enough and there's nothing you can report to your PIM for safety review. But your interface configuration shall be decided L-12, which means you'll want to go to ELC or you want to go to JEM-EF. That's a very simple question. There you'll work your instrument details or designs. [CC] Phase 0/1 normally happens after PDR, and PDR normally happens after your kickoff. [CC] I don't think there is an L-minus-date per se locking in the process, but there is a reference point for the first payload, which was set by the safety review process. It was yesterday, so that's against 2009 July launch, and you can calculate that. [CC]
TIM2-19	Wed, 19 Dec 2007		[Asked after slide 90] It would be useful if there was a schedule provided that showed if there were any differences between going to an ELC versus the JEM-EF?	No, there is no difference because HTV is your initial merging point, and an HTV integration schedule will drive the need of determination. And that's what I am showing here. [CC]

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			That would be useful. The more information we have, the better we can write our proposal to accommodate you.	I need to work with Julie to understand the guidelines. You can go through the Helpdesk, then we can send it to you. [CC]
TIM2-20	Wed, 19 Dec 2007		[Asked after slide 90] Does JAXA HTV have the possibility of uploading biological payloads to the Space Station? I know this is out of the scope of this discussion, but just as an informational kind of thing.	Yes is the answer from the science community. But technically, if there are no hazards or dangers or safety concerns. [JR/CC]
TIM2-21	Wed, 19 Dec 2007		[Asked after slide 90] In the JEM-EF facility, if there are several sites that are already occupied by Japanese payloads or other payloads, can we find out which sites are available for experiments?	Yes. If you look at the presentation, there is a picture to show you on page 52, which shows you Phase 0/1 manifest approach. At the bottom, on the ram side of the JEM-EF, it is occupied by three JAXA payloads. [CC] But you don't know if those are forever more, though. [GC] Yes but I can tell you that they will be there until 2013, 2014 because they're lifetime driven. At the bottom of this slide there is a diagram that has SMILE, MAXI etc. There are numbers on each of these items. The Number 7, ICS, is their permanent system payload, which means that's their Ku-band antenna to the ground. So that will never change. Numbers 1 and 3 may be swapped out but they have such a longer lifetime. Number 9, SEDA-AP, that's an environmental sensitive device, which also has an extreme lifetime. I don't know if JAXA would easily remove them. That's on their ram side. But if you look at the wake side, there's only one payload called HREP. That's NASA's payload, it has close to 3 years lifetime. [CC]
TIM2-22	Wed, 19 Dec 2007		[Asked on slide 52] Nine is available?	Nine is available for JAXA but they are occupied with

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				a center EP if you see that, and that has an extended lifetime. [CC]
			I thought there were two other sites in addition to Number 9?	Yes, they are one side that's available but that's HTV exposed pallet berthing port. It will never be used for any payload. That's Number 10. But there are two on top if you face Number 9; the one on the right-hand side is their system ORU temporary parking port. Number 12 is the one to your left, which is a phase-in zenith port, which is the port that is available to NASA if you want to use it. Number 11 is a permanent spot for NASA, which faces zenith. [CC]
			[What about spot number 5?	No, you cannot do it. Number 5 is Number 7's backup for a system payload for JAXA. [CC]
			That whole ram side on the JEM-EF is available to JAXA, is that what you're telling me?	Yes. At this point, unless throughout the Station lifetime they make negotiation possible. [CC]
TIM2-23	Wed, 19 Dec 2007		You discussed the time on board for some of the different missions? For ELC, does the Station change over payloads every year, every two years? Can we propose a mission that's going to be two years, or do they all have to be one year?	No (they do not have to be one year), in fact, that's probably best because it is likely we are not going to be trading experiments out. Once the Shuttle retires we will have limited return capability if any. The length of time on-orbit should be driven by the science requirements. Look at what the science for your payload to determine what the research requires. But there's probably a good chance if you only need a year or a year and a half, you could stay two or two and a half years at this point, but you should let us know what your requirement is. Keep in mind that if we start getting a lot of competition for sites, then we'll push back on longer times. But right now, we don't have many constraints in that regard. [AH]

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TIM2-23	Wed, 19 Dec 2007		[Asked on slide 73] On page 73, if the HCAM cannot be relatched, then how can the JEM-EF payload get de-orbited, how can it come back?	OK, the return, if you go to page 67, did you see that FRGF for JEM RMS on the top right side? On the inside of that bulkhead, you see those two adapter-shaped stuff, those are the PIU interfaces which will be pre-integrated on this kind of carrier, and then the return payload will be attached by using PIU. The PIU is the stuff right in front of the payload. Because it is a structured attachment, it can serve the need for returning a payload on the carrier. It's burned up; you don't see the payload anymore. [CC]
TIM2-24	Wed, 19 Dec 2007		Is there a declared dynamic envelope for the ELC?	The 49-inch height is what we're advertising for the dynamic envelope for the ELC. But understand, if you're going to be flown on an HTV, there is a height constraint that is a few inches below that for being able to be extracted from the HTV. **We don't have the exact number or how much that will reduce your height but we'll have to get that answer to you. [GC]**
			Is there a dynamic operational envelope on orbit?	What we've always advertised is that 49-inch envelope, and if you need to operate outside that, we would have to write an exception for it. And that would depend on if you're on a side that's facing the other ELC; there will obviously be a constraint. [GC]
			I'm assuming we negotiate that with JSC?	Yes, right, that's done on a case by case basis. [GC]
TIM3-1	Wed, 19 Dec 2007		At the beginning of this package, it was indicated that the AO was primarily targeted for astrophysics and heliophysics. And yet at the beginning of the WORF presentation it was primarily for Earth Science, what is the connection?	In our minds it wasn't clear if there was someone who proposed a payload that had, for example, people who have talked about testing out instruments that will be flown on planetary missions and so forth. So for completeness purposes, we have included the presentation on WORF. But is it probably more likely to be of interest to those who would want to propose

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				later for an Earth Observations kind of experiment. [AH]
			It is primarily pointed towards the Earth, is that correct?	Yes, that is correct. [JP]
			It could be used for testing other instruments that might be used for other purposes?	Yes. [AH]
			What types of experiments have been flown with the WORF?	The WORF hasn't flown yet. The WORF will have AgCAM, EarthKAM and will be used for crew photography. [AH] I think the confusion is that there is the window and then there is the WORF. So, the window is being used right now and the WORF is not since it is not on ISS right now. [CE]
TIM3-2	Wed, 19 Dec 2007		How many sites are available to for external payloads in terms of planning through 2010?	We have potentially 4 payloads that will likely fly up to use the ELC, 3 Zenith, 1 Nadir. So there will be 4 additional ELC sites available for use for proposed payloads. For the JEM-EF, there are a total of 5; 1 is a U.S. site being used so there will be 4 available on the wake side. [AH] This is negotiable, but since they made some first choices, we may have to work this harder. (AH) 3 wake, 1 nadir (CM) For Columbus, it depends on their payloads that are going up on the 1E flight and some replacements. ESA has 3 future payloads that will fly to the Columbus. Over time we will have over half these which is what we are supposed to have for that facility. [GC]

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TIM3-3	Wed, 19 Dec 2007		The AO states that the payloads will launch before 2015, it sounds like it the site will tied up until then. Will they?	That is not the case, we should access to all three platforms, if you have an experiment. The fact that JAXA has used all the "beach front" property on the JEM-EF doesn't mean that they have rights to it through the duration. So, if you have some science that needs to be done on one of those platforms, we should be able to get you a location. [CC]
TIM3-4	Wed, 19 Dec 2007		You said as of 2010, there will be 3 zenith facing sites on the ELC filled with experiments. Does that mean that there is only one zenith facing ELC site available?	One of the Zenith pointing payloads will be completed by 2010. There will be two sites available. [AH]
TIM3-5	Wed, 19 Dec 2007		If they fly AMS will the AMS go onto one of the Zenith sites?	No, we will still have 4 ELCs, the site they will go on won't be one of the sites where an ELC is located. We will have another ELC on P3 on the other side of the truss. [AH]
TIM3-6	Wed, 19 Dec 2007		Will the attendance roster from this briefing be available to potential proposers for purposes of networking and possible teaming?	We do not release the attendance roster; however, there is a teaming site available as stated in the SMEX AO section 7.1.6 offers a teaming page at the following website http://explorers.larc.nasa.gov/team.html. [RW]
TIM3-7	Wed, 19 Dec 2007		On Chart 17 in the **ISS Unpressurized Payload Accommodations** presentation, when that chart was briefed, are we looking at the ISS flying forward with the Columbus and JEM modules are at the front of ISS as it flies along orbit, the ISS is pitched downward so that the Columbus and JEM modules are lower that the other modules. Is that the correct interpretation? It is pitched down like an airplane? At 12 degrees?	Yes [GC] Correct, that is my understanding. [GC]

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TIM3-8	Wed, 19 Dec 2007		On Chart 38 (JEM-EF viewing), the two middle panels are in the +Z direction, I take this to mean that it is pointing in the nadir direction, down towards Earth. In the upper panel at orbital noon, there is part of a solar array in the field of view, is it correct to understand that this is an angular plot so the center of the picture is directly at the nadir and if you move away from the center you are moving off at angles. Is that the way to look at this? So, they are sweeping through the field of view. In terms of angle, how far to they intrude? Do they get within 10 degrees of nadir or 20 or 30? Do we know how close they are getting to nadir?	Yes, that is correct. One thing that needs to be pointed out is that the solar arrays are constantly moving. [GC] We have two of the Magic Team studies that show exactly how much area is going to be swept by the solar arrays. If we can get the information approved through Export Control, we can post that information on the web. They show the ELC and JEM views. We don't have one for the Columbus. It should show over time would be the blockage. [GC]
TIM3-9	Wed, 19 Dec 2007		During the time the ISS is in umbra (orbital night), are there running lights on the solar arrays? And, will there be any lights from ISS that will be reflected off the solar array? There is light leaking out of ISS that can be reflected by the solar arrays?	I've seen some reflection studies, but nothing about the navigation lights. There might be light from a window, but there are no running navigation lights. [GC] Yes, but I am not aware of any environment teams data that would show how much light leakage there is. [GC]
TIM3-10	Wed, 19 Dec 2007		For planning purposes, what is the minimum duty cycle should we plan for?	The reason that we are not able to give you a good answer on that is because there is a set amount of power that can be supplied to the sites. It is not determined by the solar arrays, but is determined by a device called a DVCU which can only transmit 4.3kW. And in order there are a lot of other things on the same power supply as the attached sites. So to

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				give you a good answer about how much power would be available to you, we would have to know the complete manifest of ISS including the pressurized volume. All we can do at this point is to state the maximum amount of power that will be available. As we get to a stage where we are planning this we will be able to timeline how much time would be available. We generally come at it from another direction of an experiment will state "we need to run x hours" and we try to factor it into our plan. [GC]
TIM3-11	Wed, 19 Dec 2007		As for total about to data, there might be some experiments that could be in a situation where they wouldn't get a result unless we get x hours of data collection. Is it reasonable to consider an extended mission life time to capture that in the event that duty cycling would limit your data collection rate?	Absolutely. [AH] And since we have limited buffering capability on Station itself, you might want to look at your experiment architecture and have some buffering on your side of the interface. [GC]
TIM3-12	Wed, 19 Dec 2007		When we write proposals we generally have to have some statement, for example, our peak power has a 30% margin on it or something like that. What I am hearing is that we can't say anything like that.	That's not true, you can say what your peak power is just be sure that it is below that 750 watts. That shouldn't be a problem for proposing. We want to make sure that no one leaves the briefing with the understanding that they will get the entire 750W 24/7, cause we don't have the capability. [GC] Maybe if we have one payload that has to be on at a certain time, we can make it a high priority and schedule it that way. [AH]
TIM3-13	Wed, 19 Dec 2007		If we don't have enough data downlink for the science, for example, we don't collect enough photons for whatever we are doing our science on, that we could extend the mission. But we would have to cost that and	At this point the experiments that we have been working with, have identified what they need and what they want. All the external payloads that we have worked with so far want to be on continuously. What Gene is pointing out, is that in the end, we

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			we have to have an idea of a firm cost is. If we don't have any idea of what the duty cycle is for data coming down or power, how do estimate what our minimum science mission duration is to do our minimum science?	might have to do some time-lining, but if as long as you stay within the bounds of the advertised capabilities then you should go ahead and submit based on what you want. And then later if for some reason it looks like we are getting a couple of high power payloads on the same ELC or potentially running into some restraint, we can go back to the payload developer or sponsor and discuss it. We don't have anyway of approaching this other than iterating it either. I think there is a high probably of getting what you want and other payloads are proceeding down that path. [AH]
			Would we be listing as a programmatic risk in all of our proposals that we can't count on things like this?	As a first order, I would say that you have to put down your requirements and as along as they are within the capabilities of what the Station says can be provided at that site. I don't think we're going to know that we would have to limit any payloads until much further along. We are not at this point, telling any payloads that are being designed or manifested that they have to restrict their operations. If you are planning on sending 6mb down 24/7, that probably won't work because there are some limitations there. But if you want to send 3-4 mb, would probably be ok. [AH] Don't lose sight of the fact that there is an optical fiber interface on the JEM-EF if have a large data rate downlink requirement you could limit yourself to the JEM-EF. The only problem with that is if you propose to just one facility it limits your chances of being manifested. [GC]
TIM3-14	Wed, 19 Dec 2007		Are there particular ISS born interruptions that could affect our data that we should know about it?	Every Increment we are asked to come up with power load shedding tables in the event there is an emergency situation that would cause a restriction of

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				power on ISS. We would need to know required power to keep the payloads alive. There is no way we can plan for a load shed event. There is no constraint that requires us to shut down power routinely. [AH]
			So there are no regular maintainace outages or anything else that we might expect?	No [AH] You have to design to be able to withstand a power outage for up to 6 hours (not 100% sure on this number). That's just for emergencies. [GC]
			Where would be find this requirement?	57003 [GC] So far the history has been that it has mainly affected internal rack payloads and we didn't have to go beyond an hour. If you are less sensitive you are better off. [AH]
TIM3-15	Wed, 19 Dec 2007		Is there any way to generalize the percentage of time that visiting spacecraft will come to the ISS in any one year?	Progress 4 times a year Soyuz 2 times a year ATV 1 time a year HTV 1 time a year COTS, unknown [AH/CC] This information should be published in future launch schedules. [CE]
TIM3-16	Wed, 19 Dec 2007		I thought in the HTV presentation that they would launch every 6 months?	No, every year
TIM3-17	Wed, 19 Dec 2007		The Japanese HTV, in the presentation by Chi Min Chang, is shows a lunch in November and July.	That's because the first one is postponed. [cc]
TIM3-18	Wed, 19 Dec 2007		If we are using a remote commanding capability such as Trek, what would be the latency period you might expect from	We believe it is 2 seconds, but we will have to check that. Its close to that. [GC, AH]

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			command to deployment/operation of the experiment? If we were going to perform an operation that required the deployment of a mechanism how would be go about this? What if you discovered something exciting from some other telescope and you want to have your instrument pointed at it in a minimal amount of time to capitalize on the extra science you might get. How would we hand that situation since we didn't know about it before hand?	 You can store commands onboard to have it automatically sent if you have an operation that requires a quick reaction or a crewmember can get involved if you are concerned about the latency. [AH] You are asking how quickly could you get an update to a command sent up? You can identify a need to support a quick reaction, to respond to an event that can't be predicated and work that out as a Special Ops mode and have that all set up, like we did during SkyLab when a solar flare go off and wanted to capture the rise time and so forth, we had a number of preparations in place to do that. I think you can set that up that everyone understand that if an event occurs, such a supernova that's gone off, we can rapidly get commands up and make it a priority, we would have to work it through the various processes, but it could be done. [AH]
TIM3-19	Wed, 19 Dec 2007		On the HTV ascent, there was a chart that suggested that there was 120V power available but the payload would have to pay for that capability. Any idea of how much that would cost?	No, actually that is a very remote capability and nobody has requested that so far. The HTV power comes from battery during ascent. It is potentially very expensive. [CC]
TIM3-20	Wed, 19 Dec 2007		Is there any expectation that some of theses pallets will be shared with more than one instrument? I mean some of the instruments that are envisioned may not required that huge commitment of resources.	Each ELC, for example, has two payload positions. Some payloads don't require much power or data downlink. So that's true. The first two we are flying don't require much of power, data or other resources. [AH] Just to add to that, if you got a payload/experiment in mind that weighs a few pounds, teaming up with other folks would be great. If your payload weighs 10

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				pounds, for example, and we have a 500pound capability there's room for a lot of neighbors if you could have compatible science that would be very useful and synergistic. [GC]
TIM3-21	Wed, 19 Dec 2007		On page 41, the power sent to the payload on the JEM-EF, is the 3kW power for all the experiments or per payload?	That's 3kW capability for each payload, this is a good example of you can't operate all 10 payloads at 3kW, there wouldn't be enough power to do that. But for short burst or a short period of time you should be able to get 3kW and then if you are at a lower level, foe example 1.5 kW or 1 kW that would be reasonable. [AH] The other thing to keep in mind is that even if we are able to give you the 3kW you have to be able to get rid of it. Heat rejection is something to look at. [GC]
TIM3-22	Wed, 19 Dec 2007		Is it possible to get an acronym list from today's presentations?	We can work that out and have it posted. [RW]
TIM3-23	Wed, 19 Dec 2007		I understand from one of your statements before, that once you are up there you are typically up there unless there is some other priority to take you off in whatever capacity that is. And in the case that you are not taken off, given that you have the funding you can continue along?	Yes, as long as it is not a resource driver and interfering with other payload operations. Then yes. We have some payloads that are assuming they will do that until another payload is selected that requires the site or if there is some resource limitation they run into. [AH]
TIM3-24	Wed, 19 Dec 2007		In terms if you are on an ELC and in terms if you are out of the typical EVA translation path, is it required to build in any EVA overrides let's say for a deployed mechanism on the payload? Or is that negotiable or voluntary? Yes, my understanding on the ELC payloads is that they are outboard as possible is not	The question that you are asking is that you have a boom or something that is deployed and it does not interfere with a translation path? Is that the scenario? [GC] It is not required necessarily for you to have an EVA override however all of that has to be approved by

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			initially in any primary EVA translation path and if you do have a boom or something of that sort that needs to be extended and for some reason an EVA is conducted within the area for some contingency or otherwise, is it required for the payload to have an EVA override?	the EVA team. We have to take this as an exception to the EVA AIT for them to rule on it. But just generically, if you are out of the translation path, it shouldn't be a problem. The only other thing we have to worry about is that if we have a payload that got a boom on it and in the future we want to use that site for something else and you have a boom that cannot be restowed then we have a problem that we got to go address. [GC]
			So that it is not initially an operational requirement?	It wouldn't be an operational requirement but it could be an eventual removal requirement. That could be something that could be done by EVA, you know to put it back in place or take it off easily and either burn it up or put it somewhere else. [AH]